

CLAIMS

1. An access point for use in a wireless local area network (WLAN), the access point comprising:

a plurality of wireless communication units, which are adapted to exchange data with mobile stations by transmitting and receiving signals over the air on different, respective frequency channels of the WLAN; and

a physical layer interface, which is adapted to be coupled to a communication medium, so as to connect the plurality of wireless communication units to communicate with a hub over a single physical link of the communication medium.

2. The access point according to claim 1, wherein the wireless communication units are adapted to communicate with the mobile stations substantially in accordance with an IEEE 802.11 specification, which defines the frequency channels.

3. The access point according to claim 1, wherein the communication medium comprises a wired local area network (LAN).

4. The access point according to claim 3, wherein the physical layer interface is adapted to transmit and receive data frames over the communication medium in accordance with an Ethernet physical layer specification.

5. The access point according to claim 1, wherein the communication medium is a distribution system medium of the WLAN.

6. The access point according to claim 1, and comprising a multiplexer, coupled between the wireless communication units and the physical layer interface so

as to selectively convey the data from the plurality of the wireless communication units to the physical layer interface for transmission over the single physical link.

7. The access point according to claim 6, and comprising a demultiplexer, coupled between the wireless communication units and the physical layer interface so as to distribute the data received over the single physical link among the plurality of the wireless communication units.

8. The access point according to claim 7, wherein the multiplexer and the demultiplexer are adapted to convey control messages, in addition to the data, which are transmitted over the communication medium between the access points and the hub.

9. The access point according to claim 6, wherein the multiplexer is adapted to generate frames of the data for transmission over the physical link, and to combine chunks of the data from two or more of the wireless communication units into each of at least some of the frames.

10. The access point according to claim 9, wherein each of the frames comprises a plurality of slots of substantially fixed length, and wherein the multiplexer is adapted to insert the chunks into respective slots together with chunk headers identifying the respective frequency channels to which the chunks belong.

11. The access point according to claim 9, wherein the multiplexer is adapted to transfer the chunks of the data from the two or more of the wireless communication units

in alternation into each of the at least some of the frames.

12. The access point according to claim 9, wherein the data conveyed from the plurality of the wireless communication units comprises data packets, and wherein the multiplexer is adapted to fragment the packets among the chunks.

13. The access point according to claim 9, wherein the multiplexer is adapted to insert into the frames, in addition to the data, control messages for transmission between the access points and the hub.

14. A system for mobile communication, comprising:
a hub;
a communication medium, coupled to the hub; and
a plurality of access points, each of which comprises:

two or more wireless communication units, which are adapted to exchange data with mobile stations by transmitting and receiving signals over the air on different, respective frequency channels of a wireless local area network (WLAN); and

a single physical layer interface, coupled to the communication medium, so as to connect the two or more wireless communication units to communicate with the hub over the communication medium.

15. The system according to claim 14, wherein the communication medium comprises a plurality of links, which are coupled to the hub, and wherein the physical layer interface is coupled to a single, respective link among the plurality of the links of the communication medium.

16. The system according to claim 14, wherein the access points have respective service areas and are arranged so that at least some of the service areas substantially overlap.

17. The system according to claim 16, wherein the hub and the wireless communication units are arranged to exchange control messages over the communication medium, via the single physical layer interface, so as to determine which of the wireless communication units is to serve each of the mobile stations.

18. The system according to claim 14, wherein the wireless communication units are adapted to communicate with the mobile stations substantially in accordance with an IEEE 802.11 specification, which defines the frequency channels.

19. The system according to claim 14, wherein the communication medium comprises a wired local area network (LAN).

20. The system according to claim 19, wherein the physical layer interface is adapted to transmit and receive data frames over the communication medium in accordance with an Ethernet physical layer specification.

21. The system according to claim 14, wherein the communication medium is a distribution system medium of the WLAN.

22. The system according to claim 14, wherein each of the access points comprises a multiplexer, coupled between the wireless communication units and the physical layer interface so as to selectively convey the data from the plurality of the wireless communication units to the

physical layer interface for transmission over the communication medium.

23. The system according to claim 22, wherein each of the access points comprises a demultiplexer, coupled between the wireless communication units and the physical layer interface so as to distribute the data received over the communication medium among the plurality of the wireless communication units.

24. The system according to claim 23, wherein the multiplexer and the demultiplexer are adapted to convey control messages, in addition to the data, which are transmitted over the communication medium between the hub and the access points.

25. The system according to claim 22, wherein the multiplexer is adapted to generate frames of the data for transmission over the communication medium, and to combine chunks of the data from two or more of the wireless communication units into each of at least some of the frames.

26. A method for mobile communication, comprising:

arranging an access point in a wireless local area network (WLAN), the access point comprising two or more wireless communication units, which are adapted to exchange data with mobile stations by transmitting and receiving signals over the air on different, respective frequency channels of the WLAN;

coupling the access point to a hub over a single physical communication link; and

conveying the data between the plurality of the wireless communication units and the hub over the single link.

27. The method according to claim 26, wherein arranging the access point comprises arranging multiple access points in the WLAN, and wherein coupling the access point comprises coupling each of the access points to communicate with the hub over a single, respective link among multiple links provided by a communication medium that is connected to the hub.
28. The method according to claim 27, wherein the access points have respective service areas, and wherein arranging the multiple access points comprises arranging the access points so that at least some of the service areas substantially overlap.
29. The method according to claim 28, and comprising exchanging control messages between the access point and the hub over the single, respective link, so as to determine which of the wireless communication units is to serve each of the mobile stations.
30. The method according to claim 26, wherein arranging the access point comprises configuring the wireless communication units to communicate with the mobile stations substantially in accordance with an IEEE 802.11 specification, which defines the frequency channels.
31. The method according to claim 26, wherein coupling the access point to the hub comprises coupling the access point and the hub to a wired local area network (LAN).
32. The method according to claim 31, wherein conveying the data comprises transmitting and receiving data frames over the LAN in accordance with an Ethernet physical layer specification.

33. The method according to claim 31, wherein the LAN is a distribution system medium of the WLAN.

34. The method according to claim 26, wherein conveying the data comprises multiplexing between the wireless communication units and the single physical link so as to selectively convey the data from the plurality of the wireless communication units to the single physical link for transmission to the hub.

35. The method according to claim 34, wherein conveying the data further comprises demultiplexing the data received over the single physical link from the hub for distribution among the plurality of the wireless communication units.

36. The method according to claim 35, and comprising transmitting control messages over the single physical link between the hub and the access point, and multiplexing and demultiplexing the control messages among the plurality of the wireless communication units.

37. The method according to claim 34, wherein multiplexing between the wireless communication units comprises generating frames of the data for transmission over the communication medium, while combining chunks of the data from two or more of the wireless communication units into each of at least some of the frames.

38. The method according to claim 37, wherein each of the frames comprises a plurality of slots of substantially fixed length, and wherein combining the chunks comprises inserting the chunks into respective slots together with chunk headers identifying the respective frequency channels to which the chunks belong.

39. The method according to claim 37, wherein combining the chunks comprises transferring the chunks of the data from the two or more of the wireless communication units in alternation into each of the at least some of the frames.

40. The method according to claim 37, wherein conveying the data comprises conveying data packets, and wherein multiplexing between the wireless communication units comprises fragmenting the packets among the chunks.

41. The method according to claim 37, wherein multiplexing between the wireless communication units comprises inserting into the frames, in addition to the data, control messages for transmission between the access points and the hub.